

Please type a plus sign (+) inside this box →

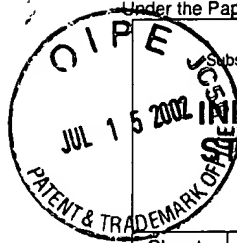
DATE FILED: July 12, 2002

PTO/SB/08A (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.



Substitute for form 1449A/PTO

## INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

### Complete If Known

Applicati n Number	09/498,303
Filing Date	February 4, 2000
First Named Invent r	Han
Group Art Unit	1763
Examiner Name	T. Dang
Attorney Docket Number	MIT7941

Sheet	1	of	5
-------	---	----	---

### U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant Of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
JD	A1	4,127,437		Bersin et al.	11-28-1978	
	B1	4,605,479		Faith, Jr.	08-12-1986	
	C1	4,806,171		Whitlock et al.	02-21-1989	
	D1	4,900,395		Syerson et al.	02-13-1990	
	E1	4,904,338		Kozicki	02-27-1990	
	F1	4,932,168		Tada et al.	06-12-1990	
	G1	5,025,597		Tada et al.	06-25-1991	
	H1	5,062,898		McDermott et al.	11-05-1991	
	I1	5,073,232		Ohmi et al.	12-17-1991	
	J1	5,078,832		Tanaka	01-07-1992	
	K1	5,089,084		Chhabra et al.	02-18-1992	
	L1	5,089,441		Moslehi	02-18-1992	
	M1	5,100,495		Ohmi et al.	03-31-1992	
	N1	5,112,437		Watanabe et al.	05-12-1992	
	O1	5,129,198		Kanno et al.	07-14-1992	
	P1	5,147,466		Ohmori et al.	09-15-1992	
	Q1	5,167,761		Westendorp et al.	12-01-1992	
	R1	5,173,152		Tanaka	12-22-1992	
	S1	5,174,855		Tanaka	12-29-1992	
	T1	5,209,028		McDermott et al.	05-11-1993	
	U1	5,238,500		Bergman	08-24-1993	

MAILED  
JUL 18 2002  
GROUP 1700

### FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant Of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T <sup>6</sup>
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)				
JD	V1	WO	94 27315		IMEC Inter Uni Micro Electro.; Adv. Semiconductor Mat.	11-24-1994		
	W1	EP	0 732 733		Nippon Electric; ASM Japan	09-18-1996		
	X1	EP	0 602 633		Texas Instruments	06-22-1994		
	Y1	EP	0 288 263		BOC Group Inc.	10-26-1988		
	Z1	WO	92 22084		Advantage Prod Tech	12-10-1992		
	AA1	JP	08 316189		Hitachi Ltd	11-29-1996		x(Abst).

Examiner Signature		Date Considered	10/2/02
-----------------------	--	--------------------	---------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box →

DATE FILED: July 12, 2002

PTO/SB/08A (08-00)

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

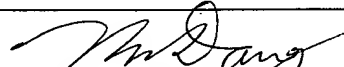
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  <i>(Use as many sheets as necessary)</i>		Application Number	09/498,303
		Filing Date	February 4, 2000
		First Named Inventor	Han
		Group Art Unit	1763
		Examiner Name	T. Dang
Sheet 2 of 5	Attorney Docket Number	MIT7941	

U.S. PATENT DOCUMENTS						
Examiner Initials*	Cite No. <sup>1</sup>	U.S. Patent Document		Name of Patentee or Applicant Of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code <sup>2</sup> (if known)			
TD	A2	5,244,535		Ohtsuka et al.	09-14-1993	
	B2	5,268,069		Chapple-Sokol et al.	12-07-1993	
	C2	5,294,261		McDermott et al.	03-15-1994	
	D2	5,294,568		McNeilly et al.	03-15-1994	
	E2	5,315,793		Peterson et al.	05-31-1994	
	F2	5,336,356		Ban et al.	08-09-1994	
	G2	5,348,619		Bohannon et al.	09-20-1994	
	H2	5,357,991		Bergman et al.	10-25-1994	
	I2	5,372,652		Srikrishnan et al.	12-13-1994	
	J2	5,377,911		Bauer et al.	01-03-1995	
	K2	5,378,312		Gifford et al.	01-03-1995	
	L2	5,403,434		Moslehi	04-04-1995	
	M2	5,425,845		Wong	06-20-1995	
	N2	5,439,553		Grant et al.	08-08-1995	
	O2	5,456,758		Menon	10-10-1995	
	P2	5,512,106		Tamai et al.	04-30-1996	
	Q2	5,567,332		Mehta	10-22-1996	
	R2	5,580,421		Hiatt et al.	12-03-1996	
	S2	5,584,963		Takahashi	12-17-1996	
	T2	5,589,422		Bhat	12-31-1996	
	U2	5,635,102		Mehta	06-03-1997	

MAILED  
JUL 18 2002  
GROUP 1700

FOREIGN PATENT DOCUMENTS							
Examiner Initials*	Cite No. <sup>1</sup>	Foreign Patent Document			Name of Patentee or Applicant Of Cited Document	Date of Publication of Cited Document MM-DD-YYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Office <sup>3</sup>	Number <sup>4</sup>	Kind Code <sup>5</sup> (if known)			

Examiner Signature		Date Considered	10/2/02
--------------------	---	-----------------	---------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

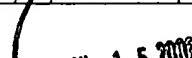
Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant commissioner for Patents, Washington, DC 20231.

Please type a plus sign (+) inside this box →

Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO			<div style="text-align: center;">  </div>		
<div style="text-align: center;"> <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b> </div> <div style="text-align: center;"> <i>(Use as many sheets as necessary)</i> </div>			<b>Complete If Known</b>		
			Applicant Number	09/498,303	
			Filing Date	February 4, 2000	
			First Named Inventor	Han	
			Group Art Unit	1763	
			Examiner Name	T. Dang	
Sheet	3	of	5	Attorney Docket Number	MIT7941

[illegible][illegible]

Examiner Signature		Date Considered	10/2/02
-----------------------	---	--------------------	---------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Unique citation designation number. <sup>2</sup>See attached Kinds of U.S. Patent Documents. <sup>3</sup>Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup>For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup>Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. <sup>6</sup>Applicant is to place a check mark here if English language Translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. **DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant commissioner for Patents, Washington, DC 20231.**

DATE FILED: July 12, 2002

Please type a plus sign (+) inside this box →

PTO/SB/08B (08-00)


Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		Application Number	09/498,303
		Filing Date	February 4, 2000
		First Named Inventor	Han
		Group Art Unit	1763
		Examiner Name	T. Dang
Sheet 4 of 5	Attorney Docket Number	MIT7941	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Included name of the author (in CAPITAL LETTERS). Title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
TD	A4	PETERSON et al., "Contamination Removal by CO <sub>2</sub> Jet Spray," SPIE Vol. 1329, <i>Optical System Contamination: Effects, Measurement, Control II</i> , pp. 72-85, 1990.	
	B4	LAYDEN et al., "High velocity carbon dioxide snow for cleaning vacuum system surfaces," <i>J. Vac. Sci. Technol. A</i> , Vol. 8, No. 5, pp. 3881-3883, Sep/Oct 1990.	
	C4	IZUMI et al., "A New Cleaning Method by Using Anhydrous HF/CH <sub>3</sub> OH Vapor System," <i>Japanese Journal of Applied Physics</i> , Int. Conf. On Solid State Devices and Materials, pp. 135-137, August 1991.	
	D4	WONG et al., "Characterization of Wafer Cleaning and Oxide Etching Using Vapor-Phase Hydrogen Fluoride," <i>J. Electrochem. Soc.</i> , Vol. 138, No. 6, pp. 1799-1802, June 1991.	
	E4	SYVERSON et al., "The Removal of Reactive Ion Etch Residues," Technical Report WC/DC/WS/R, TR 386, FSI International, Chaska, MN, May 10, 1993.	
	F4	SYVERSON et al., "Post Metal Etch Residue Removal Using Vapor Phase Processing Tech.," Technical Report WC/DC/WS/R, TR 392, FSI International, Chaska, MN, May 24, 1993.	
	G4	GAY et al., "Vapor Phase cleaning of Submicron Inter-Metal Vias," Technical Report DC/DE, TR 397, FSI International, Chaska, MN, November, 1993.	
	H4	BOHANNON et al., "Polysilicon Emitter Vapor Clean Characterization on an EXCALIBUR MVP," Technical Report DCSE, TR 393, FSI International, Chaska, MN, November 10, 1993.	
	I4	BOHANNON et al., "Titanium Salicide Vapor Clean Development on an EXCALIBUR MVP," Technical Report DCSE, TR 394, FSI International, Chaska, MN, November 10, 1993.	
	J4	WERKHOVEN et al., "Cluster-Tool Integrated HF Vapor Etching For Native Oxide Free Processing," <i>Mat. Res. Soc. Symp. Proc.</i> , Vol. 315, pp. 211-217, 1993.	
	K4	WATANABE et al., "Influence of Water Adsorption/Desorption Processes on the Selectivity of Vapor HF Etching," <i>J. Electrochem. Soc.</i> , Vol. 142, No. 4, pp. 1332-1340, April 1995.	
	L4	TONG et al., "The Removal of Polymeric/Silicate Residues and Reduction of Contact Resistance for Inter-metal Via Holes by Vapor Phase HF Cleaning," Surface Conditioning Systems Technical Report, Document No. 1024-TRS-1196, FSI International, Chaska, MN, October 1996.	
	M4	ALLGAIR et al., "Nanoscale patterning of silicon dioxide thin films by catalyzed HF vapor etching," <i>Nanotechnology</i> , Vol. 7, pp. 351-355, 1996.	
	N4	LEE et al., "Dry Release for Surface Micromachining with HF Vapor-Phase Etching," <i>Journal of Microelectromechanical Systems</i> , Vol. 6, No. 3, pp. 226-232, September 1997.	

Examiner Signature		Date Considered	10/2/02
--------------------	---	-----------------	---------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Unique citation designation number. <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant commissioner for Patents, Washington, DC 20231.

DATE FILED: July 12, 2002

Please type a plus sign (+) inside this box →

PTO/SB/08B (08-00)

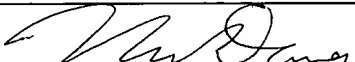
Approved for use through 10/31/2002. OMB 0651-0031

U.S. Patent and Trademark Office: U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO		<b>Complete If Known</b>	
<b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (Use as many sheets as necessary)		Application Number	09/498,303
		Filing Date	February 4, 2000
		First Named Inventor	Han
		Group Art Unit	1763
		Examiner Name	T. Dang
		Attorney Docket Number	MIT7941
Sheet	5	of	5

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. <sup>1</sup>	Included name of the author (in CAPITAL LETTERS). Title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T <sup>2</sup>
TD	A5	SAITO et al., "X-ray Photoelectron Study on the Adsorption of Anhydrous Hydrogen Fluoride onto Silicon Native Oxide," <i>Jpn. J. Appl. Phys.</i> , Vol. 36, Part 2, No. 11A, pp. L1466-L1469, November 1997.	
	B5	HABUKA et al., "In situ cleaning method for silicon surface using hydrogen fluoride gas and hydrogen chloride gas in a hydrogen ambient," <i>Journal of Crystal Growth</i> , Vol. 186, pp. 104-112, 1998.	
	C5	NAKAZAWA et al., "Selective Etching of Silicon Native Oxide with Remote-Plasma-Excited Anhydrous Hydrogen Fluoride," <i>Jpn. J. Appl. Phys.</i> , Vol. 37, Part 2, No. 5A, pp. L537-538, May 1998.	
	D5	CHANG et al., "Anhydrous HF etch reduces processing steps for DRAM capacitors," <i>Solid State Technology</i> , pp. 71-76, May 1998.	
	E5	SHERMAN et al., "The removal of hydrocarbons and silicone grease stains from silicon wafers," <i>J. Vac., Sci. Technol. B</i> , Vol. 8, No. 3, pp. 563-567, May/June 1990.	
	F5	PHILIPPOSIAN, "The Activity of HF/H <sub>2</sub> O Treated Silicon Surfaces in Ambient Air Before and After Gate Oxidation," <i>Proc., Second Int. Symp. On Cleaning Technology in Semiconductor Device Manufacturing</i> , pp. 234-250, Oct. 1992.	
	G5	NAKANISHI et al., "Precise Control of SiO <sub>2</sub> Etching Characteristics Using Mono-Layer Adsorption of Hf/H <sub>2</sub> O Vapor," <i>Int. Conf. On Solid State Devices &amp; Materials</i> , Extended Abstracts, C-1-4, pp. 255-257, August 1995.	
	H5	PATENT ABSTRACTS OF JAPAN, Vol. 1997, No. 03, & JP 08316189A, Hitachi Ltd., March 1997.	
	I5	HAN et al., "Characterization of Silicon Oxide Etching and Cleaning in HF Vapor Process," <i>Meeting Abstracts, Fifth Int. Symp. On Cleaning Technology in Semiconductor Device Manufacturing</i> , ECS, Paris, France, August 1997.	
	J5	HAN et al., "Characterization of Silicon Oxide Etching and Cleaning in HF Vapor Process," <i>Proceedings, Cleaning Technology in Semiconductor Device Manufacturing V</i> , Novak et al., Editors, February 27, 1998.	
	K5	HAN et al., "Etching and Cleaning of Silicon Wafers using HF Vapor Process in the Non-condensed Etching Regime," Abstract, <i>American Vacuum Society National Meeting</i> , Baltimore, MD, November 1998.	
	L5	HAN et al., "Characterization of Silicon Oxide Etching in HF Vapor Process," Abstract, <i>American Vacuum Society National Meeting</i> , San Jose, CA, November 1997.	
	M5	HAN, "HF Vapor Etching and Cleaning of Silicon Wafer Surfaces," Ph.D. Thesis, Massachusetts Institute of Technology, Cambridge, MA, July 1999.	
	N5	KWON, "Post Oxide Etching Cleaning Process Using Integrated Ashing and HF Vapor Process," Masters Thesis, Massachusetts Institute of Technology, Cambridge, MA, May 1999.	

Examiner Signature		Date Considered	10/2/02
--------------------	---	-----------------	---------

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup>Unique citation designation number. <sup>2</sup>Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Assistant commissioner for Patents, Washington, DC 20231.